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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,135	02/26/2004	Koji Nakamura	01-567	3479

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POSZ LAW GROUP, PLC
12040 SOUTH LAKES DRIVE
SUITE 101
RESTON, VA 20191

EXAMINER	
SMITH, TYRONE W	

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/786,135	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Tyrone W. Smith	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 5, 7, 8, 10, 11 and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837).

Regarding Claims 1, 11 and 18. Sajima discloses electric motor drive control apparatus, which includes a semiconductor switching element(s) (Figure 1 items TR1-TR4; refer also to Figure 5) interposed in a current flowing passage to a motor (Figure 1 item M); a PWM control unit (Figure 1 item 7; column 2 lines 11-42) for generating a PWM signal having a predetermined PWM frequency; a driving circuit (Figure 1 item 10 and 11) for making the semiconductor switching element(s) carry out a switching operation under plural driving states, and driving the semiconductor switching element in PWM (Pulse Width Modulation) mode according to the PWM signal under an instructed driving state; an overheat state detecting unit (Figure 1 item 6; column 2 lines 43-67 and column 3 lines 1-17) for outputting an overheat state detecting signal on a condition that a current/temperature of the semiconductor switching current across the motor exceeds a predetermined threshold value and the semiconductor switching current across the motor element falls into an overheat state or a state in which the probability that the semiconductor switching element will shift to the overheat state is higher than a predetermined probability; and a driving control unit (Figure 1 items 14) for instructing the

driving state of the semiconductor switching element(s) from the driving circuit for controlling the rise time and fall time of the semiconductor switching element(s) during an output period of the overheat state detecting signal (column 3lines 26-67 and column 4 lines 1-57).

However, Sajima does not disclose specifically disclose reading the overheat or overcurrent from the semiconductor switch and controlling rise time (on) and fall time (off) of the semiconductor switching element during as output period of the overheat state detecting signal are shorter (lowering the signal) than the rise time (on) and fall time (off) of the semiconductor switching element during a non-output period of the overheat state detecting signal.

Kudo discloses an overcurrent restriction in an inverter, which includes switching elements (Figure 3 items Q1-Q6); a PWM control unit/driving controller (Figure 3 item 4) for generating a PWM signal having a predetermined PWM frequency and for instructing the driving state of the semiconductor switching element(s) from the driving circuit for controlling the rise time and fall time of the semiconductor switching element(s) during an output period of the overheat state detecting signal; driving circuit/overheat detection (Figure 3 item 3) for making the semiconductor switching element(s) carry out a switching operation under plural driving states and driving the semiconductor switching element(s) in PWM (Pulse Width Modulation) mode according to the PWM signal under an instructed driving state and for outputting an overheat state detecting signal on a condition that a current of the semiconductor switching current exceeds a predetermined threshold value and falls into an overheat state. Further, the system sends a PWM signal for making the switching element(s) to a rise time (on) and fall time (off) state within a time shorter than the predetermined period of the switching element is generated, after detection of overcurrent. Refer to the abstract and pages 3 through 4 of Kudo.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an

inverter. The advantage of combining the two would provide a system that can suppress the waveform distortion of output current to a minimum even if an inverter is in a PWM saturation range.

Regarding Claim 2. Sajima discloses the driving control unit (Figure 1 items 14) that controls the PWM control unit so that the PWM frequency during the output period of the overheat state detecting signal is lower than the PWM frequency during the non-output period of the overheat state detecting signal. The signal from the PWM controller, by way of the driving controller, is interrupted or lowered so that the motor comes to a complete stoppage. Refer to column 4 lines 11-21.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter. The advantage of combining the two would provide a system that can suppress the waveform distortion of output current to a minimum even if an inverter is in a PWM saturation range.

Regarding Claim 5. Kudo discloses an overheat state detecting unit includes a current detecting unit (Figure 3 items R1-R6) for detecting current flowing in the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected current exceeds a predetermined threshold value.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter. The advantage of combining the two would provide a system that can suppress the waveform distortion of output current to a minimum even if an inverter is in a PWM saturation range.

Regarding Claim 7. Kudo discloses that the overheating state detecting unit (Figure 3 item 3) outputs the overheating state detecting signal during a period when a duty ratio of PWM driving exceeds a predetermined threshold value. Refer to the abstract.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter. The advantage of combining the two would provide a system that can suppress the waveform distortion of output current to a minimum even if an inverter is in a PWM saturation range.

Regarding Claim 8. Kudo discloses the overheat state detecting unit (Figure 3 item 3) outputs an overheat state detecting signal that has two threshold values (Kudo invention senses overheat state or overheat threshold at each of the transistors which is inputted to the detector to be processed) for an output judgment of the overheat state detecting signal and is brought with a hysteresis characteristic.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter. The advantage of combining the two would provide a system that can suppress the waveform distortion of output current to a minimum even if an inverter is in a PWM saturation range.

Regarding Claim 10. Regarding the motor as an air blowing fan motor for heat exchanger in a cooling system for a vehicle. Both Sajima and Kudo use electric type motors that can run the system used in the current invention. Refer to M.P.E.P. 2144.07: Art Recognized Suitability for an Intended Purpose. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) (Claims to a printing ink comprising a

solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301.). See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious); Ryco, Inc. v. Ag-Bag Corp., 857 F.2d 1418, 8 USPQ2d 1323 (Fed. Cir. 1988) (Claimed agricultural bagging machine, which differed from a prior art machine only in that the brake means were hydraulically operated rather than mechanically operated, was held to be obvious over the prior art machine in view of references which disclosed hydraulic brakes for performing the same function, albeit in a different environment.). In this case any motor can be used to operate a fan system in a motor vehicle or similar.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter. The advantage of combining the two would provide a system that can suppress the waveform distortion of output current to a minimum even if an inverter is in a PWM saturation range.

3. Claims 3, 12, 14 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) as applied to claims 1, 2, 5, 7, 8, 10, 11 and 18 above, and further in view of Li (4547715).

Regarding Claims 3 and 12. Sajima discloses electric motor drive control apparatus and Kudo discloses an overcurrent restriction in an inverter as described in the previous rejection. However, neither Sajima nor Kudo disclose resistance value of a resistor connected to the semiconductor-switching element on the basis of an instruction from a driving source to thereby vary the rise time and fall time (pulses or current) of the semiconductor-switching element.

Li discloses a current control circuit, which includes a motor (Figure 1 item 18), transistors (Figure 1 items 14 and 16) and a variable resistor (Figure 1 item 12) connected to item 14 transistor by way of a power source (Figure 1 items 9 and 11; refer also to items 48 and 49). The amount of current (pulses) passing through the transistors is adjustable by the adjustment of a variable resistor. Adjustment of the value of the resistor permits the appropriate sizing of transistor as to current pr pulse carrying capability.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter and Li's current control circuit. The advantage of combining the inventions would provide a circuit for limiting the maximum current through the inductive load. The adjustable resistor would be set to accommodate the appropriate size of the semiconductor device protecting the motor by limiting the maximum current to which the motor would be subjected.

Regarding Claim 14. Kudo discloses an overheat state detecting unit includes a current detecting unit (Figure 3 items R1-R6) for detecting current flowing in the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected current exceeds a predetermined threshold value.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter and Li's current control circuit. The advantage of combining the inventions would provide a circuit for limiting the maximum current through the inductive load. The adjustable resistor would be set to accommodate the appropriate size of the semiconductor device protecting the motor by limiting the maximum current to which the motor would be subjected.

Regarding Claim 16. Kudo discloses that the overheating state detecting unit (Figure 3 item 3) outputs the overheating state detecting signal during a period when a duty ratio of PWM driving exceeds a predetermined threshold value. Refer to the abstract.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter and Li's current control circuit. The advantage of combining the inventions would provide a circuit for limiting the maximum current through the inductive load. The adjustable resistor would be set to accommodate the appropriate size of the semiconductor device protecting the motor by limiting the maximum current to which the motor would be subjected.

4. Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) as applied to claims 1, 2, 5, 7, 8, 10, 11 and 18 above, and further in view of Ito (5068777).

Regarding Claim 4. Sajima discloses electric motor drive control apparatus and Kudo discloses an overcurrent restriction in an inverter as described in the previous rejection. However, neither Sajima nor Kudo disclose a temperature detecting unit for detecting a temperature of the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected temperature exceeds the threshold value.

Ito discloses a PWM type inverter having temperature compensation which includes a motor (Figure 1 item 300), a switching device (Figure 1 item 200) and a temperature detector (Figure 1 item 800) connected to the switching device for outputting the overheat state detecting signal during a period when the detected temperature approaches or exceeds the threshold value. Refer to column 5 lines 7-23.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter and Ito's a PWM type inverter having temperature compensation. The advantage of combining the two would provide controlling the carrier frequency in accordance with the inverter output frequency or the temperature of the controllable elements, or output current, so that the generation of noise is suppressed and the loss of power is reduced.

5. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) as applied to claims 1, 2, 5, 7, 8, 10, 11 and 18 above, and further in view of Ohiwa et al (6703803).

Regarding Claim 6. Sajima discloses electric motor drive control apparatus and Kudo discloses an overcurrent restriction in an inverter as described in the previous rejection. However, neither Sajima nor Kudo disclose a power supply voltage detecting unit for outputting the overheat state detecting signal during a period when a detected power supply voltage exceeds a predetermined threshold value.

Ohiwa discloses a fan motor driving circuit which includes a power supply voltage detecting (Figure 1 item 90) unit for outputting the overheat state detecting signal during a period when a detected power supply voltage exceeds a predetermined threshold value. Refer to the abstract.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter and Ohiwa's a fan motor driving circuit. The advantage of combining the two would provide a system that can vary the elementary signal for determining the rotary speed of the fan motor according to the output voltage of the power source voltage detecting means automatically when the power source voltage is elevated over a predetermined value.

6. Claim 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) as applied to claims 1, 2, 5, 7, 8, 10, 11 and 18 above, and further in view of Nishino et al (6141494).

Regarding Claim 9. Sajima discloses electric motor drive control apparatus and Kudo discloses an overcurrent restriction in an inverter as described in the previous rejection. However, neither Sajima nor Kudo disclose a PWM control unit is equipped with a motor voltage detecting unit for detecting a voltage applied to the motor, and determines the duty ratio of the PWM signal on the basis pf an instructed motor voltage and a detected motor voltage.

Nishino discloses a DC motor driving system which includes a PWM control unit (Figure 1 item 12A) which is equipped with a motor voltage detecting unit (Figure 1 item 25) for detecting a voltage applied to the motor, and determines the duty ratio of the PWM signal on the basis of an instructed motor voltage (Figure 1 item 21) and a detected motor voltage. Refer to the abstract, column 9 lines 21-67 and column 10 lines 1-7.

It would have been obvious to one of ordinary skill in the art at the time of invention to use Sajima's electric motor drive control apparatus with Kudo's an overcurrent restriction in an inverter and Nishino's a DC motor driving system. The advantage of combining the two would a

motor driven system for a motor vehicle which system is imparted with a capability for detecting rotation state of the DC motor with high accuracy and enhanced reliability.

7. Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) and Li (4547715) as applied to claims 3, 12, 14 and 16 above, and further in view of Ito (5068777).

Regarding Claim 13. Sajima discloses electric motor drive control apparatus, Kudo discloses an overcurrent restriction and Li discloses a current control circuit in an inverter as described in the previous rejection(s). However, the prior art(s) of record does not disclose a temperature detecting unit for detecting a temperature of the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected temperature exceeds the threshold value.

Ito discloses a PWM type inverter having temperature compensation which includes a motor (Figure 1 item 300), a switching device (Figure 1 item 200) and a temperature detector (Figure 1 item 800) connected to the switching device for outputting the overheat state detecting signal during a period when the detected temperature approaches or exceeds the threshold value. Refer to column 5 lines 7-23.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the prior art(s) of record with Ito's a PWM type inverter having temperature compensation. The advantage of combining the two would provide controlling the carrier frequency in accordance with the inverter output frequency or the temperature of the controllable elements, or output current, so that the generation of noise is suppressed and the loss of power is reduced.

8. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) and Li (4547715) as applied to claims 3, 12, 14 and 16 above, and further in view of Ohiwa et al (6703803).

Regarding Claim 15. Sajima discloses electric motor drive control apparatus, Kudo discloses an overcurrent restriction and Li discloses a current control circuit in an inverter as described in the previous rejection(s). However, the prior art(s) of record does not disclose a power supply voltage detecting unit for outputting the overheat state detecting signal during a period when a detected power supply voltage exceeds a predetermined threshold value.

Ohiwa discloses a fan motor driving circuit which includes a power supply voltage detecting (Figure 1 item 90) unit for outputting the overheat state detecting signal during a period when a detected power supply voltage exceeds a predetermined threshold value. Refer to the abstract.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the prior art(s) of record with and Ohiwa's a fan motor driving circuit. The advantage of combining the two would provide a system that can vary the elementary signal for determining the rotary speed of the fan motor according to the output voltage of the power source voltage detecting means automatically when the power source voltage is elevated over a predetermined value.

9. Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Sajima (5530788) in view of Kudo (JP10-271837) and Li (4547715) as applied to claims 3, 12, 14 and 16 above, and further in view of Nishino et al (6141494).

Regarding Claim 17. Sajima discloses electric motor drive control apparatus, Kudo discloses an overcurrent restriction and Li discloses a current control circuit in an inverter as

described in the previous rejection(s). However, the prior art(s) of record does not disclose a PWM control unit is equipped with a motor voltage detecting unit for detecting a voltage applied to the motor, and determines the duty ratio of the PWM signal on the basis pf an instructed motor voltage and a detected motor voltage.

Nishino discloses a DC motor driving system which includes a PWM control unit (Figure 1 item 12A) which is equipped with a motor voltage detecting unit (Figure 1 item 25) for detecting a voltage applied to the motor, and determines the duty ratio of the PWM signal on the basis of an instructed motor voltage (Figure 1 item 21) and a detected motor voltage. Refer to the abstract, column 9 lines 21-67 and column 10 lines 1-7.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the prior art(s) of record and Nishino's a DC motor driving system. The advantage of combining the two would a motor driven system for a motor vehicle which system is imparted with a capability for detecting rotation state of the DC motor with high accuracy and enhanced reliability.

Response to Arguments

10. Applicant's arguments filed June 7, 2005 have been fully considered but they are not persuasive.

The Applicant argues that (1) there would be no advantage to combine the prior art references since Sajima fixes the switching element in the second states and Kudo intercepts the gate signal, neither of which actions can be combined to teach the claimed invention and (2) neither reference teaches reading the overheat or overcurrent from the semiconductor switch and controlling rise time (on) and fall time (off) of the semiconductor switching element during as output period of the overheat state detecting signal are shorter (lowering the signal) than the

rise time (on) and fall time (off) of the semiconductor switching element during a non-output period of the overheat state detecting signal..

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Further, The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (Claims directed to a method of treating depression with amitriptyline (or nontoxic salts thereof) were rejected as prima facie obvious over prior art disclosures that amitriptyline is a compound known to possess psychotropic properties and that imipramine is a structurally similar psychotropic compound known to possess antidepressive properties, in view of prior art suggesting the aforementioned compounds would be expected to have similar activity because the structural difference between the compounds involves a known bioisosteric replacement and because a research paper comparing the pharmacological properties of these two compounds suggested clinical testing of amitriptyline as an antidepressant. The court sustained the rejection, finding that the teachings of the prior art provide a sufficient basis for a reasonable expectation of success.); Ex parte Blanc, 13 USPQ2d 1383 (Bd. Pat.App. & Inter. 1989) (Claims were directed to a process of sterilizing a polyolefinic composition with high-energy radiation in the presence of a phenolic polyester antioxidant to inhibit discoloration or degradation of the polyolefin. Appellant argued that it is unpredictable

whether a particular antioxidant will solve the problem of discoloration or degradation. However, the Board found that because the prior art taught that appellant's preferred antioxidant is very efficient and provides better results compared with other prior art antioxidants, there would have been a reasonable expectation of success.).

In this case, Sajima discloses electric motor drive control apparatus, which includes a semiconductor switching element(s) interposed in a current flowing passage to a motor; a PWM control unit for generating a PWM signal having a predetermined PWM frequency; a driving circuit for making the semiconductor switching element(s) carry out a switching operation under plural driving states, and driving the semiconductor switching element in PWM (Pulse Width Modulation) mode according to the PWM signal under an instructed driving state; an overheat state detecting unit for outputting an overheat state detecting signal on a condition that a current/temperature of the semiconductor switching current across the motor exceeds a predetermined threshold value and the semiconductor switching current across the motor element falls into an overheat state or a state in which the probability that the semiconductor switching element will shift to the overheat state is higher than a predetermined probability; and a driving control unit for instructing the driving state of the semiconductor switching element(s) from the driving circuit for controlling the rise time and fall time of the semiconductor switching element(s) during an output period of the overheat state detecting signal. Kudo discloses an overcurrent restriction in an inverter, which includes switching elements; a PWM control unit/driving controller for generating a PWM signal having a predetermined PWM frequency and for instructing the driving state of the semiconductor switching element(s) from the driving circuit for controlling the rise time and fall time of the semiconductor switching element(s) during an output period of the overheat state detecting signal; driving circuit/overheat detection (Figure 3 item 3) for making the semiconductor switching element(s) carry out a switching operation under

plural driving states and driving the semiconductor switching element(s) in PWM (Pulse Width Modulation) mode according to the PWM signal under an instructed driving state and for outputting an overheat state detecting signal on a condition that a current of the semiconductor switching current exceeds a predetermined threshold value and falls into an overheat state. Further, the system sends a PWM signal for making the switching element(s) to a rise time (on) and fall time (off) state within a time shorter than the predetermined period of the switching element is generated, after detection of overcurrent. Examiner believes that there is reason to combine based on the limitations as presented in the claims with a reasonable amount of success.

Examiner believes that Kudo teaches reading the overheat or overcurrent from the semiconductor switch and controlling rise time (on) and fall time (off) of the semiconductor switching element during as output period of the overheat state detecting signal are shorter (lowering the signal) than the rise time (on) and fall time (off) of the semiconductor switching element during a non-output period of the overheat state detecting signal based on the abstract where it states a PWM signal for making the switching element to ON or OFF state within a time shorter than the predetermined period of the switching element is generated, after detection of an overcurrent.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tyrone W. Smith whose telephone number is 571-272-2075. The examiner can normally be reached on weekdays from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin, can be reached on 571-272-2800 ext. 37. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tyrone Smith
Patent Examiner

Art Unit 2837

MARLON T. FLETCHER
PRIMARY EXAMINER